WHAT IS CLAIMED IS:

1. A method of generating return-to-zero (RZ) optical data in a digital lightwave communications system, comprising the steps:

providing radio frequency (RF) electrical data to a first stage modulator for modulating a light input so as to generate an intermediary optical data output having a non-return-to-zero (NRZ) format;

controlling a phase difference between said intermediary optical data output and a clock signal associated therewith using a feedback control loop operable responsive at least in part to a phase dither reference signal;

adjusting said clock signal based on a phase control signal provided by said feedback control loop to generate a phase-adjusted clock signal; and

providing said phase-adjusted clock signal to a second stage modulator operable to blank out a select portion of data intervals of said intermediary optical data output for creating optical data having an RZ format.

2. The method of generating RZ optical data as set forth in claim 1, wherein said RF electrical data is operable in a Gigabits per second (Gbps) range.

3. The method of generating RZ optical data as set forth in claim 1, wherein said step of controlling a phase difference comprises the steps:

providing an output generated by a synchronous (SYNC) detector operable to detect signal transitions in said optical data due to a phase difference between said intermediary optical data output and said clock signal to an amplifier stage, said SYNC detector operating responsive at least in part to an RF amplitude dither reference signal in an RF data amplitude feedback control loop associated with said first stage modulator;

providing an output generated by said amplifier stage to a phase SYNC detector operating in response to said phase dither reference signal to generate a phase error signal; and

providing said phase error signal to a phase error amplifier having its reference input grounded, said phase error amplifier operating to generate an output signal that is groomed into said phase control signal.

4. The method of generating RZ optical data as set forth in claim 3, wherein said output signal is groomed in a voltage limitation step.

5. The method of generating RZ optical data as set forth in claim 4, wherein said voltage limitation step is followed by adding a phase dither signal.

6. The method of generating RZ optical data as set forth in claim 3, wherein said first stage modulator comprises a Mach-Zehnder modulator.

7. The method of generating RZ optical data as set forth in claim 3, wherein said second stage modulator comprises a Mach-Zehnder modulator.

8. The method of generating RZ optical data as set forth in claim 3, wherein said select portion of said data intervals comprises approximately a half data interval.

9. The method of generating RZ optical data as set forth in claim 3, wherein said first and second stage modulators are associated with an optical transmitter disposed in a long-haul digital lightwave communications system.

10. The method of generating RZ optical data as set forth in claim 3, further comprising the steps:

effectuating a bias point feedback control loop associated with said first stage modulator;

effectuating an RF clock amplitude feedback control loop associated with said second stage modulator; and

effectuating a bias point feedback control loop associated with said second stage modulator.

11. The method of generating RZ optical data as set forth in claim 10, wherein said RF data amplitude feedback control loop associated with said first stage modulator is a 1st order negative feedback control loop.

12. The method of generating RZ optical data as set forth in claim 10, wherein said RF clock amplitude feedback control loop associated with said second stage modulator is a 1st order negative feedback control loop.

13. The method of generating RZ optical data as set forth in claim 10, wherein said bias point feedback control loop associated with said first stage modulator is a 1st order negative feedback control loop.

14. The method of generating RZ optical data as set forth in claim 10, wherein said bias point feedback control loop associated with said second stage modulator is a 1st order negative feedback control loop.

15. The method of generating RZ optical data as set forth in claim 3, wherein said light input is provided by a continuous wave (CW) laser source.

16. A system for generating return-to-zero (RZ) optical data in a digital lightwave communications system, comprising:

a first stage modulator operable to modulate a light input into an intermediary optical data output having a non-return-to-zero (NRZ) format based on a radio frequency (RF) electrical data provided thereto;

a feedback controller operable to control a phase difference between said intermediary optical data output and a clock signal associated therewith, said feedback controller for generating a phase control signal;

a phase adjuster operable to adjust said clock signal into a phase-adjusted clock signal based on said phase control signal; and

a second stage modulator operable to blank out a select portion of data intervals of said intermediary optical data output for creating optical data having an RZ format, said second stage modulator operating responsive at least in part to said phase-adjusted clock signal.

17. The system for generating RZ optical data as set forth in claim 16, wherein said RF electrical data is operable in a Gigabits per second (Gbps) range.

18. The system for generating RZ optical data as set forth in claim 16, wherein said feedback controller includes:

an amplifier stage operable to receive an output generated by a synchronous (SYNC) detector operating to detect signal transitions in said optical data due to a phase difference between said intermediary optical data output and said clock signal, said SYNC detector operating responsive at least in part to an RF amplitude dither reference signal in an RF data amplitude feedback controller associated with said first stage modulator;

a phase SYNC detector coupled to said amplifier stage for receiving an output therefrom, phase SYNC detector operating in response to a phase dither reference signal to generate a phase error signal; and

a phase error amplifier operable responsive to said phase error signal, said phase error amplifier for generating an output signal that is groomed into said phase control signal.

19. The system for generating RZ optical data as set forth in claim 18, wherein said feedback controller further includes a voltage limiter for limiting said output signal to a predetermined range.

20. The system for generating RZ optical data as set forth in claim 19, wherein said feedback controller further includes means for adding a phase dither signal to said voltage limiter's output.

21. The system for generating RZ optical data as set forth in claim 18, wherein said first stage modulator comprises a Mach-Zehnder modulator.

22. The system for generating RZ optical data as set forth in claim 18, wherein said second stage modulator comprises a Mach-Zehnder modulator.

23. The system for generating RZ optical data as set forth in claim 18, wherein said select portion of said data intervals comprises approximately a half data interval.

24. The system for generating RZ optical data as set forth in claim 18, wherein said first and second stage modulators are associated with an optical transmitter disposed in a long-haul digital lightwave communications system.

25. The system for generating RZ optical data as set forth in claim 18, further comprising:

a bias point feedback controller associated with said first stage modulator for providing a bias control signal thereto;

an RF clock amplitude feedback controller associated with said second stage modulator for providing an RF clock amplitude control signal thereto; and

a bias point feedback controller associated with said second stage modulator for providing a bias point control signal thereto to optimally bias said optical data.

26. The system for generating RZ optical data as set forth in claim 25, wherein said RF data amplitude feedback controller associated with said first stage modulator is a 1st order negative feedback control circuit.

27. The system for generating RZ optical data as set forth in claim 25, wherein said RF clock amplitude feedback controller associated with said second stage modulator is a 1st order negative feedback control circuit.

28. The system for generating RZ optical data as set forth in claim 25, wherein said bias point feedback controller associated with said first stage modulator is a 1^{st} order negative feedback control circuit.

29. The system for generating RZ optical data as set forth in claim 25, wherein said bias point feedback controller associated with said second stage modulator is a 1^{st} order negative feedback control circuit.

30. The system for generating RZ optical data as set forth in claim 18, wherein said light input is provided by a continuous wave (CW) laser source.